HGLP-LDR-076, Rev. 1

299-E33-18 (A4844)
Log Data Report

Borehole Information:

Borehole:	299-E33-18 (A4844)		**Site:**	216-B-7A & B Cribs	
Coordinates (WA St Plane)		**GWL[1] (ft):**	254.95	**GWL Date:**	07/19/07
North (m)	**East (m)**	**Drill Date**	**TOC Elevation**	**Total Depth (ft)**	**Type**
137386.064	573779.166	02/50	655.22 ft	278	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	2.5	8 5/8	8	5/16	2.5	278

Borehole Notes:

Log Data Reports for this borehole have been previously issued in December 2001, August 2006 (DOE-EM-GJ1302-2006), and August 2007 (HGLP-LDR-076). This report is an update based on additional logging conducted in June 2008 at depths from 220 to 271 feet. In addition to spectral gamma logging, moisture data were also acquired. Moisture data were also collected in 2006 and 2007. Current log data are reported and are compared with previous logging events.

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System:	Gamma 4L		**Type:**	SGLS (60%) SN: 47TP32211A
Effective Calibration Date:	12/31/07	**Calibration Reference:**	HGLP-CC-027	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Neutron Moisture Logging System (NMLS) Equipment Information:

Logging System:	Gamma 4H		**Type:**	NMLS SN: H310700352
Effective Calibration Date:	11/06/07	**Calibration Reference:**	HGLP-CC-021	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat			
Date	06/09/08	06/09/08			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	220.0	234.0			
Finish Depth (ft)	271.0	239.0			
Count Time (sec)	200	200			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	N/A[2]	N/A[3]			
Pre-Verification	DL421CAB	DL421CAB			
Start File	DL421000	DL421052			
Finish File	DL421051	DL421057			

Log Run	1	2 Repeat			
Post-Verification	DL421CAA	DL421CAA			
Depth Return Error (in.)	N/A	- 4.0			
Comments	No fine-gain adjustment	No fine-gain adjustment			

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	3	4 Repeat			
Date	06/10/08	06/10/08			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	195.0	195.0			
Finish Depth (ft)	255.0	255.0			
Count Time (sec)	15	15			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	0.25	0.25			
ft/min	N/A	N/A			
Pre-Verification	DHF02CAB	DHF02CAB			
Start File	DHF02000	DHF02000			
Finish File	DHF02240	DHF02240			
Post-Verification	DHF02CAA	DHF02CAA			
Depth Return Error (in.)	N/A	N/A			
Comments	None	None			

Logging Operation Notes:

Logging was conducted with a centralizer on each sonde. Measurements are referenced to the top of casing. Repeat sections were collected in this borehole to evaluate the logging systems' performance.

Analysis Notes:

Analyst:	Henwood	Date:	06/25/08	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging systems were performed before and after each day's data acquisition. Acceptance criteria were met.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet template identified as G4LDec07.xls. A casing correction for 0.322-in.-thick casing was applied to the SGLS data. This casing thickness is the same used to correct the 2001, 2006, and 2007 data. A correction for water was applied to the data below 255 feet.

Results and Interpretations:

Manmade radionuclides detected in this borehole for the current logging event (2008) are U-238, U-235, and Co-60. Cs-137, detected at the bottom of the borehole at approximately 270 ft in 2007, was not detected during this logging event.

Evidence of processed uranium (U-238 and U-235) exists from 232 to 259 ft and near 270 feet. U-238 concentrations are determined by the Pa-234m energy peak at 1001 keV. U-235 is directly measured by the 185.72 keV energy peak. The maximum concentrations for U-238 and U-235 are approximately 1667 and 135 pCi/g, respectively at 236.0 ft.

Co-60 is detected between 233 and 263 ft at a maximum concentration of approximately 0.9 pCi/g at 240 ft.

Moisture logging results from 219 to 238 ft indicate a significant increase in moisture content to near saturation (e.g., approximately 20 to 40 percent is evident). Below 239 ft, moisture remains relatively high (10 to 25 percent) until groundwater is reached at approximately 255 ft. The highest moisture content appears at the same depths as the highest uranium concentrations. The moisture data acquired in 2008 is consistent with the 2006 and 2007 data but may be indicating a slight increase between 229 and 238 ft since 2006.

The naturally occurring KUT log data indicate potential fine-grained sediment layers that may act as "perching" horizons. For example, the K-40 and Th-232 profiles suggest a relatively thick fine-grained interval from 238 to 246 ft. The driller's log refers to these sediments as "coarse sand and some clay." This interval lies just below the sediments that exhibit the highest moisture content.

Comparisons of spectral gamma log data of manmade radionuclides acquired in 1992, 1997, 2001, 2006, 2007, and 2008 are included in the table below and a plot. The uranium data in the table are the maximum concentrations reported in the respective years.

	YEAR MAXIMUM CONCENTRATIONS REPORTED					
	1992	1997	2001	2006	2007	2008
U-238	None detected	439 pCi/g	623 pCi/g	1237 pCi/g	1532 pCi/g	1667 pCi/g
U-235	None detected	25 pCi/g	51 pCi/g	104 pCi/g	137 pCi/g	135 pCi/g

In 1992, no uranium was detected. Co-60 was detected at a few depths where stationary measurements were made to document the existence of Co-60 at less than 3 pCi/g. Continuous logging at consecutive depth intervals, as conducted in subsequent logging events, was not performed in 1992. Between 1992 and 1997, an influx of uranium was detected from 235 to 252 ft. Uranium (U-238) concentrations continued to increase in 2001, 2006, 2007, and 2008; U-235 shows no increase since 2007.

The manmade uranium appears to be associated with a moisture anomaly. It is postulated that some or all of the observed uranium may be dissolved in the pore fluid, and is migrating in a perched zone just above the groundwater level.

Co-60 concentrations after correction for decay indicate possible increases between 232 and 242 ft in depth since 1992 but appear stable since 2006.

The repeat sections for the SGLS and NMLS indicate good agreement.

In January 2008, borehole 299-E33-344 was drilled approximately 10 ft to the east of 299-E33-18. Drilling was initially terminated at 228 ft when the borehole encountered the perched water interval. No manmade uranium or Co-60 was detected. However, the maximum depth was about 5 ft above the uranium and Co-60 detected in 299-E33-18.

In February 2008, a second borehole 299-E33-345 (C6626) was drilled approximately 10 ft north of 299-E33-18. Total depth in this borehole was 264 feet. This borehole also encountered perched water between 218 to 243 ft. Manmade uranium was detected from 231 to 240 ft, with a maximum concentration of 75 pCi/g at 236 ft; no Co-60 was detected. Evaluation of gamma energy spectra from the two boreholes (299-E33-345 and 299-E33-18) indicate that the discrepancy in manmade uranium concentrations (75 pCi/g in 299-E33-345 compared to 1667 pCi/g in 299-E33-18 and the lack of Co-60 in borehole 299-E33-345) is not due to detector malfunction or incorrect compensation for borehole conditions. This implies a high degree of lateral heterogeneity in manmade uranium concentrations within the perched zone and/or interaction of uranium in the pore fluid with the well casing. Note: Co-60 existed in this borehole when it was first logged in 1992, before uranium was first detected by logging in 1997, suggesting an historical waste stream, absent uranium, may have interacted with the casing.

List of Plots:

Man-Made Radionuclides (220-280 ft)
Natural Gamma Logs (220-280 ft)
Combination Plot (190-280 ft)
Total Gamma, Dead Time & Moisture (190-280 ft)
Comparison of Manmade Radionuclides (1992 to 2008) (220-280 ft)
Comparison of Moisture (2006-2008)
Repeat Section for Man-Made Radionuclides
Repeat Section of Natural Gamma Logs
Repeat Section for Moisture

[1] GWL – groundwater level
[2] N/A – not applicable